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No. 5

REPORT OF THE THIRTY-FOURTH ANNUAL MEETING OF THE OHIO ACADEMY OF SCIENCE

The Thirty-fourth Annual Meeting of The Ohio Academy of Science was held at the Ohio State University, Columbus, April 18 and 19, 1924, under the Presidency of Prof. Kirtley F. Mather. One hundred and fourteen members were registered as in attendance; fifty-nine new members were elected.

GENERAL PROGRAM.

FRIDAY, APRIL 18.

- 9:30 A. M.—Business Meeting.
- 10:30 A. M.—Reading of Papers in General Session.
- 2:00 P. M.—The Invitation Address by Dr. Albert P. Mathews, of the University of Cincinnati, on "How Shall We Measure the Quantity of Life?"
- 3:00 P. M.—Reading of Papers in Sectional Meetings.
- 6:30 P. M.—Annual Banquet, Ohio Union, followed by an address of welcome by Dean William McPherson, Ohio State University, with response by Dr. Edward L. Rice, Ohio Wesleyan University.
- 8:00 P. M.—Address by the President of the Academy, Prof. Kirtley F. Mather, Denison University, on "Geologic Factors in Organic Evolution," Campbell Hall Auditorium.

SATURDAY, APRIL 19.

- 9:00 A. M.—Adjourned Business Meeting.
- 10:30 A. M.—Reading of Papers in General Session and in Botany Section.
- 2:00 P. M.—Reading of Papers in Sectional Meetings and Demonstrations.

MINUTES OF BUSINESS MEETINGS.

The first business session was called to order by President Mather at 9:45 A. M. on Friday, April 18, 1924, and an adjourned session was held at 9:00 A. M. on the following day.

The President announced the appointment of the following committees for the meeting:

Committee on Membership—Dwight M. DeLong, Lewis H. Tiffany, Raymond J. Seymour, Harold E. Burt, Frederick C. Blake.

Committee on Resolution—Albert P. Weiss, E. L. Moseley, Edgar N. Transeau.

Committee on Necrology.—Herbert Osborn,

The following *Auditing Committee* was elected by the Academy: Geo. D. Hubbard and H. C. Beardslee.

The following *Nominating Committee* was elected by the ballot of the Academy: Raymond C. Osburn, Lewis H. Tiffany, Geo. D. Hubbard, Raymond J. Seymour, Harold E. Burt, Frederick C. Blake.

Report of the Secretary.

The following report by the Secretary was received and ordered filed.

COLUMBUS, O., April 18, 1924.

To the Ohio Academy of Science:

The year now closing marks a change, as you know, in the Secretariate of the Academy and your Secretary has the distinct conviction that he would be untrue to the real feelings of the members of the Academy, certainly to his own, if he were to allow this fact to pass unnoticed, even if such a thing were possible. Of course all present miss from its accustomed place the genial face of the former Secretary, Dr. Edward L. Rice. During the eleven years of faithful service Dr. Rice not only made a real contribution to the Academy but made himself so useful, so helpful, not to say indispensable, that in the minds of many of us the names "Ohio Academy of Science" and "Edward L. Rice, Secretary" are almost synonymous. But words are unnecessary: "His works do praise him."

It is only fair to say, also, that the work of the former Secretary did not end with the election of his successor, since upon him fell the duty, for example, of clearing up the odds and ends after the Annual Meeting at Oberlin in March, of preparing the Annual Report for the printer, of notifying newly-elected officers, members and fellows, of sending out copies of resolutions passed at the last Annual Meeting, and of preparing a report of the meeting for *Science*, etc. It was therefore early in July before the complete and formal transfer of the archives was made

and even then the former Secretary was not entirely released, as we have freely availed ourselves of his generous offer to lend assistance at any time and in any way possible.

Furthermore it should be stated that *the Secretariate was turned over in an excellent, up-to-date condition.*

The first item of more than routine importance to claim the attention of the new Secretary was the publication in pamphlet form of a memoir of the late Emerson McMillin, referred to on page 281 of the Proceedings of the Thirty-third Annual Meeting. Some 50 copies of this memoir were published by the Academy and distributed to the family and selected friends of Mr. McMillin.

The next item of general interest to the Academy was an invitation from the Ohio Forestry Association, through its Secretary, Prof. Edmund Secrest, inviting the members of the Academy to participate, as guests of the Association, in a field meeting at the John Bryan Park on September 21 and 22, 1923. This invitation was passed on to the members of the Academy in a letter dated September 8, 1923. Several members of the Academy availed themselves of this very courteous invitation, much to their pleasure and delight, and one or two of our members appeared on the program put on by the Association.

Owing to the sudden and unexpected passing away of our most distinguished member, the late Dr. T. C. Mendenhall, on March 22, 1924, the Secretary assumed the authority to call Dr. E. L. Rice over the long distance telephone and request him to represent the Academy at the funeral services held at Ravenna. This he consented to do and did. This action has since been approved by the Executive Committee.

The routine work of the office has been about as usual and very considerable; details have been taken care of as promptly and as efficiently as possible under the circumstances.

The generous, helpful cooperation of all the officers of the Academy has been a source of real inspiration throughout the year, for which hearty thanks are due and hereby recorded.

WILLIAM H. ALEXANDER, *Secretary.*

Report of the Treasurer for the Year 1923-1924.

The following report by the Treasurer was received and referred to the Auditing Committee whose report is appended.

To the Ohio Academy of Science:

The Treasurer submits the following report for the period from March 26, 1923, to April 2, 1924:

RECEIPTS.	
Cash balance on hand March 26, 1923.....	\$766.05
Librarian's sales of publications.....	37.97
Interest on certificate of deposit.....	19.50
Members dues, paid through the A. A. A. S. and directly to the Treasurer.....	709.14
Total receipts.....	\$1,532.66

DISBURSEMENTS.

American Association for the Advancement of Science.....	\$ 76.00
Columbian Building and Loan Association, for deposit.....	750.00
H. C. Cowles, traveling expenses.....	30.00
E. L. Rice, secretarial and traveling expenses.....	10.78
Earl Sheffel, refund.....	2.00
Independent Print Shop.....	29.00
Spahr & Glenn, Printers.....	3.25
A. E. Kraus, Print Shop.....	32.00
Herbert Osborn, traveling expenses.....	13.50
Wm. Alexander, secretarial expenses.....	18.15
Eunice McCray, stenographic service.....	10.00
Helen M. Coleman, stenographic service.....	3.25
Total Disbursements.....	\$ 977.93
Cash balance on hand April 2nd, 1924.....	554.73
Assets—Certificate of deposit for.....	650.00
Total Assets.....	\$1,204.73

The original purchase of a certificate of deposit for \$750.00 was later reduced \$100.00 to pay the honorarium to the Academy Secretary. It will be noted that this item does not appear above. Cancelled checks and vouchers are herewith submitted with the books.

Dr. Burton E. Livingston, Permanent Secretary of the A. A. A. S., reported that the plan of having joint dues in the Academy and the A. A. A. S. payable through his office was working satisfactorily.

Respectfully submitted,

A. E. WALLER, *Treasurer.*

Books, checks and vouchers submitted and found to be correct.

GEO. D. HUBBARD,

H. C. BEARDSLEE,

Auditing Committee.

Report of the Executive Committee.

The following report of the Executive Committee was received and ordered filed.

COLUMBUS, O., April 18, 1924.

To the Ohio Academy of Science:

A meeting of the Executive Committee was held in Columbus on November 9, 1923, with all members present except the President, who because of absence from the State could not attend the meeting. By invitation Vice-President Barrows and Prof. Raymond C. Osburn were present, the former presiding over the meeting.

A letter was read from President Mather, extending greetings and good wishes and suggesting among other things that some action should be taken regarding the expenses of Prof. Herbert Osborn as the duly accredited representative of the Academy to the Leidy Commemorative Meeting to be held in Philadelphia on December 6, 1923. Thereupon the committee instructed the Treasurer to reimburse Professor Osborn for all necessary expenses incurred in this connection.

The Secretary was requested and authorized to make such arrangements as might seem wise in the establishing of temporary headquarters for the visiting members of the Ohio Academy at the annual meeting of the American Association for the Advancement of Science to be held in Cincinnati the latter part of December, 1923. This action was very satisfactorily carried out through the generous cooperation of members of the Academy living in Cincinnati.

At this meeting of the committee it was decided to accept the invitation of the Ohio State University to hold the Thirty-fourth Annual Meeting of the Academy at that institution. It was also agreed that the time should be "very near Easter" but the exact date was left for the Secretary to determine after some further investigations.

A second meeting of the Executive Committee was held in Columbus at the office of the Secretary last evening with all members present.

At this meeting forty applications for membership in the Academy were approved subject to final ratification by the Academy.

The Secretary placed before the committee a cordial invitation from the Faculty of the College of Wooster, heartily seconded by the staff of the Ohio Agricultural Experiment Station, to hold the next Annual Meeting of the Academy at Wooster. The committee decided to refer the invitation to the Academy for such action as it may see fit to take.

The following letter from Dr. Burton E. Livingston, Permanent Secretary, American Association for the Advancement of Science, written in reply to a letter inviting Dr. Livingston or some other officer of the A. A. A. S. to be present at the Annual Meeting of this Academy, was laid before the committee, viz.:

WASHINGTON, D. C., March 18, 1924.

DEAR MR. ALEXANDER:—I have your letter of March 10 and have read it with much interest. It is the plan of the American Association to have, whenever possible, a representative of the Association in attendance at each annual meeting of the affiliated academies. This was decided at the Cincinnati meeting. But the whole question of the arrangements with affiliated academies has recently come up again for discussion and we think it will be best not to begin naming official representatives for academy meetings till the Executive Committee has had opportunity to define the attitude of the Association in regard to affiliated academies in a manner clearer than has thus far been done. We are making a serious study of the whole problem of academy affiliation and it may be possible that some improvements can be introduced. When we do begin to send representatives to the academy meetings, those representatives should naturally have the whole matter clearly in mind, and that could not be the case at present. There will doubtless be important matters to be discussed with the several academies.

I hope you will understand from this why I feel that we should postpone till a later time our beginning to name official representatives for the academy meetings.

I should like nothing better than to come to your meeting myself and I hope to be able to do so next year, perhaps.

Thanking you, and with all good wishes for the great success of your meeting,

Yours very sincerely,

BURTON E. LIVINGSTON,
Permanent Secretary.

The following communication was received from Charles E. Deam, President of the Indiana Academy of Science, and referred to the Academy for action, viz.:

BLUFFTON, IND., April 9, 1924.

DEAR MR. ALEXANDER:—I am sorry I shall not be able to attend the meeting of the Ohio Academy of Science April 18 and 19.

I wish if you do so, you would extend a most cordial invitation to all members of the Ohio Academy of Science to meet with the Indiana Academy of Science at their spring meeting to be held at Marengo, Ind., May 15-17.

At this meeting those who wish may go through the Marengo Cave at Marengo, and on the second day may go through Wyandotte Cave, about 13 miles distant. The field trips will be very interesting to the botanist and the geologist. The leader of the botanical section is well acquainted with the area and will show such rare plants as *Isoetes Engelmannii*, *Smilax Bona-nox*, and many others that are extremely local. The geologists will be led by one who has walked the entire region and is well acquainted with it. Come in hiking clothes.

Yours most cordially,

CHAS. C. DEAM.

An invitation was read from the President and Secretary of The Franklin Institute, Philadelphia, Pa., to participate in the celebration on September 17, 1924, of the *Centenary* of the signing of the Act of Incorporation of the Institute, by the appointment of a representative; this invitation is also referred to the Academy for action.

An invitation was also read from the British Association for the Advancement of Science, inviting members of this Academy to attend its Annual Meeting to be held in Toronto from August 6 to 13, 1924. Your Executive Committee suggests the names of Dr. A. E. Waller and Dr. Edward L. Rice as delegates to this meeting.

Respectfully submitted,

WILLIAM H. ALEXANDER,

For the Committee.

Report of the Publication Committee.

The following report of the Publication Committee was received and ordered filed:

The Annual Report of the Thirty-third Meeting, Proceedings, Vol. VII, Part 8, contained 29 pages and was published November 26, 1923. The report minus the membership list was also published in the *Ohio Journal of Science*: 23: 209-234, 1923.

Respectfully submitted,

H. C. SAMPSON, *Chairman.*

Report of the Library Committee.

The following report of the Library Committee was received and ordered filed:

COLUMBUS, O., April 18, 1924.

To the Ohio Academy of Science:

The Library Committee begs to report that all duties devolving upon it have been discharged as promptly as possible.

The sale of publications during the year amounted to \$37.97. This amount has been turned over to the Treasurer of the Academy.

The Proceedings of the Thirty-third Annual Meeting, 1923, were received from the printer in December and copies were mailed to all members of the Academy and to the exchanges early in the year 1924.

The publications received by the Academy on exchange have been added to the sets filed in the University Library. The scientific sections of the library have been increased annually by the purchase of many important sets and the hope is expressed that more and more the University Library will serve as the center of scholarly research by members of the Academy.

Respectfully submitted,

C. W. REEDER,

For the Library Committee.

Report of the Trustees of the Research Fund.

The Trustees reported, orally, that owing to the very recent death of their Chairman, Dr. T. C. Mendenhall, who had full charge of the books and records pertaining to the work of the Board of Trustees and usually prepared the report, it had been impossible for the other members to prepare a written report in time for this meeting, or to work out the details of the plan recommended by Dr. Mendenhall and endorsed by the Academy at the last Annual Meeting (see page 282, Proceedings, Thirty-third Annual Meeting) regarding the investment of the Research Fund and the use of the income therefrom. The Board requested another year in which to prepare a report. The request was granted.

A preliminary examination of the bank accounts, made soon after the April, 1924, meeting of the Academy, shows the following: Bills to the amount of \$126.36 were paid subsequent to April 1, 1923, and additions from interest on bonds amounting to \$27.62 have been credited, leaving a cash balance of \$724.82, or a total resource with bonds of \$1,324.82.)

In this connection the Secretary read the following letter written by Dr. Mendenhall only three days before his death:

RAVENNA, O., March 19, 1924.

MY DEAR MR. ALEXANDER:

Yours of the 17th has reached me together with another communication from you of an earlier date, which I found awaiting me on my arrival from Columbus on last Saturday night. You are perhaps by this time aware that I have been in the City of Columbus for the last two weeks, the victim of the ingenuity and indefatigable zeal of the doctors,

who have been doing everything that they can for me, or rather, I should say to me and eventually for me.

However, the investigation with all that has gone along with it has fatigued me very much and I was glad to reach home Saturday night. Now this has been a painful and possibly serious affair with me, and therefore, you will see that I must at once abandon all attempts to do anything for the Academy of Science for some time to come.

I regret this very much as there are several things which should be looked after in regard to the Emerson McMillin Fund. Not one single transaction has taken place so the financial situation is precisely as I have reported plus, of course, the income from our invested funds, so it will be very easy to determine approximately what amount will be available on the 19th of April. I hope to be able to prepare something in the form of a report by that time.

Yours faithfully,

T. C. MENDENHALL.

Upon motion duly made and carried, the Trustees were instructed to conserve the income from the McMillin Fund during the ensuing year.

Report of the Committee on State Parks and Conservation.

The Chairman of the Committee, Prof. Herbert Osborn, stated that the committee had not succeeded in having any formal meetings as it is made up, very properly, of members scattered through the State and there had been no convenient occasion on which to get the members together. It is of interest to report, however, that there has been distinct progress in the matter of reservations for park, game refuge and forestry purposes which have materially extended the areas devoted to these purposes and which we may count as distinct advances. The Bryan State Park which includes part of the Clifton Gorge and which was mentioned in our last report as likely to be finally accepted by the State has now definitely become State property and is administered by the State Experiment Station, so that it may be counted as permanently devoted to park and reservation purposes and its scenic, biologic and geologic features preserved for future students.

At a meeting of the State Forestry Society last September, to which our members were invited, as pointed out in the Secretary's Report, we had an opportunity to observe the conditions and possibilities there under very favorable circumstances.

The Roosevelt Game Refuge, now embracing some 15,000 acres, was dedicated last fall and is already proving its value in stimulating interest and activity in the preservation of the native plants and animals of the region. Additional tracts have been secured for the state forests and these have distinct value as areas in which conditions will serve to perpetuate our native fauna and flora. The park system of Cleveland, which was visited with the kind guidance of Professor Fullmer, gives very encouraging evidence of a broad plan for the development of adequate park areas including some remarkably fine natural scenery and the preservation of natural conditions for plant and animal life.

The publication of the Naturalists Guide by the Ecological Society of America and for which the Ohio areas have been very carefully listed by Dr. E. Lucy Braun, is expected in the near future and will make available to our members a detailed list of tracts now reserved or which should be made into reservations when possible. There is a manifest interest in this subject in many of the states and great progress has been made in some of our sister states, notably New York and Iowa, and we may expect a growing appreciation of its importance and efforts of the Academy should be continued in order that the scientific aspects may receive proper attention.

This statement by the chairman of the committee was received as a report of progress and the committee continued.

Report of the Committee on Legislation.

The chairman of the Committee made an oral statement to the effect that in as much as the General Assembly failed to pass the bill (H. B. No. 400) that was before it at the time of our last meeting and as there has been no session of the Assembly since that time, the committee has not been able to do anything more than "watchful waiting." This statement was received as a report of progress and the committee continued.

Election of Officers.

The following officers and committee members for 1924-25 were elected by the ballot of the Academy.

President—Prof. Edgar N. Transeau, Ohio State University, Columbus.

*Vice-Presidents:**Zoology*—Ralph V. Bangham, Wooster College, Wooster.*Botany*—Prof. Edmund Secrest, Ohio Agricultural Experiment Station, Wooster.*Geology*—Prof. G. W. Conrey, Ohio State University, Columbus.*Medical Sciences*—Prof. R. G. Hoskins, Ohio State University, Columbus.*Psychology*—Prof. F. C. Dockeray, Ohio Wesleyan University, Delaware.*Physical Sciences*—Prof. C. D. Coons, Denison University, Granville.*Secretary*—William H. Alexander, U. S. Weather Bureau, Columbus.*Treasurer*—Dr. A. E. Waller, Ohio State University, Columbus.*Elective Members of the Executive Committee*—Prof. C. G. Shatzer, Springfield; Prof. Bradley M. Patten, Cleveland.*Member Publication Committee*—Prof. Lewis G. Westgate, Delaware.*Trustee Research Fund*—Dr. Edward L. Rice, Ohio Wesleyan University, Delaware.*Member of Library Committee*—Prof. Frederick C. Blake, Ohio State University, Columbus.*Legislative Committee*—Wm. H. Alexander, Columbus; M. M. Metcalf, Oberlin; Paul M. Rea, Cleveland; Edward L. Rice, Delaware; L. B. Walton, Gambier.*Representatives on Editorial Board of Ohio Journal of Science:**Zoology*—Prof. R. A. Budington, Oberlin College, Oberlin.*Botany*—Prof. Bruce Fink, Miami University, Oxford.*Geology*—Prof. G. D. Hubbard, Oberlin College, Oberlin.*Medical Sciences*—Prof. F. C. Waite, Western Reserve University, Cleveland.*Psychology*—Prof. H. A. Aikins, Western Reserve University, Cleveland.*Physical Sciences*—Prof. S. J. M. Allen, University of Cincinnati, Cincinnati.*Election of Members.*

The following persons were regularly nominated and elected to membership in the Academy:

ALDERMAN, OVID A.; Botany, Zoology; 308 Bowman St., Wooster.

BARTHOLOMEW, PAUL S.; Botany, Entomology, Ornithology; R. F. D. No. 3, Sycamore.

BEARSS, ESTHER; Biology; Cochran Hall, Westerville.

BEAVER, WILLIAM C.; Zoology, Medical Sciences, Botany; Head of Department of Biology, Wittenberg College, Springfield.

BILSING, S. W.; Entomology, Zoology; College Station, Texas.

BUSCH, K. G. A.; Chemistry, Botany; Capital University, Columbus.

CAMP, WENDELL H.; Geology, Zoology; Otterbein College, Box 101, Westerville.

- CASKEY, MARION W.; Zoology; Ohio State University, Columbus.
CONGER, ALLEN C.; Zoology; Darlington Road, Delaware.
DEHUS, DELORES; Biology; 714 S. Main St., Ada.
DICKERSON, BESSIE; Zoology, Medical Sciences; New Concord.
DIETZ, DAVID; Astronomy, Physics; The Cleveland Press, Cleveland.
EDWARDS, LINDEN FOREST; Zoology; Reynoldsburg.
GAMBRELL, FOSTER LEE; Entomology, Zoology; Ohio State University, Columbus.
GILLESPIE, J. S.; Geology; 1075 Madison Ave., Columbus.
GOODWIN, HOWARD R.; Archaeology; Ohio State Archaeological and Historical Museum, Columbus.
GOURLEY, J. H.; Horticulture; Wooster.
HALL, SCHULER P.; Physics; Wooster College; Wooster.
HARP, HUGH G.; Astronomy, Meteorology; Wittenberg College; Springfield.
HEATH, A. B.; Physical Geography, Meteorology, Geology; 544 Franklin St., Hamilton.
HEFNER, ROBERT A.; Zoology, Astronomy; 238 W. Tenth Ave., Columbus.
HENDERSON, A. LEE; Psychology, Medical Sciences; 489 Maynard Ave., Columbus.
HILKER, H. V.; Geology, Archaeology; 325 N. Third St., Hamilton.
JOHNSON, H. M.; Psychology; Ohio State University; Columbus.
JONES, MERLIN PERRY; Entomology, Botany; 89 Euclid Ave., Columbus.
KAO, CHUNG KWAI; Botany; 101 W. Eighth Ave., Columbus (Permanent address: Hoking, Yunnan, China).
LAFLEUR, ALBERT; Geography, Geology, Meteorology, History; Box 357, Athens.
LAMBORN, R. E.; Geology; Department of Geology, O. S. U.; Columbus.
LEWIS, GEORGE; Electro and Radio Physics; Crosley Radio Corporation, Cincinnati.
LINDSEY, A. W.; Entomology, Zoology; Denison University, Granville.
LUSK, RALPH G.; Geology; Granville.
MASON, CAPT. PAUL; Archaeology, Meteorology, Public Health; 271 S. Champion Ave., Columbus.
MARTIN, CLARE; Chemistry, Physics; State Normal College, Bowling Green.
MATHEWS, ALBERT P.; Biochemistry, Physiology; University of Cincinnati; 255 Loraine Ave., Cincinnati.
MILLER, DAVID F.; Zoology; 1466½ Pennsylvania Ave., Columbus.
MOON, M'DELLA; Botany, Zoology; 48 Seventeenth Ave., Columbus.
MOSES, C. F.; Geology; Muskingum College; New Concord.
OLSON, HENRY W.; Zoology; 356 Centner Ave., Columbus.
ORR, GROVER L.; Chemistry, Physics; Capital University, 767 College Ave., Columbus.
PALLISTER, JOHN C.; Entomology, Zoology; Cleveland Museum of Natural History, 2717 Euclid Ave., Cleveland.

- PATTERSON, EDNA; Zoology, Entomology, Botany, Astronomy; 130 W. Tenth Ave., Columbus.
- PETERSON, CHARLES J.; Botany, Horticulture; Peterson Nurseries Co., Wilmington.
- POLLITZ, LOUISE C.; Geology, Geography, Ecology; Cleveland Museum of Natural History, Cleveland.
- REEVES, PRENTICE; Psychology, Medical Sciences; 208 N. Sandusky St., Delaware.
- RICKEY, EDNA; Psychology, Medical Sciences; 53 Smith Place, Columbus.
- ROFKAR, WILLIAM F.; Zoology, Botany, Geology; 504 Beall Ave., Wooster.
- SCHRADIECK, HENRY E.; Ichthyology, Fish Culture; Urbana University, Urbana.
- TILFORD, PAUL E.; Botany, Chemistry; Ohio Agricultural Experiment Station, Wooster.
- TUTTLE, W. W.; Physiology, Psychology; Bremen.
- VER STEEG, CARL; Geology, Geography; 324 Nold Ave., Wooster.
- WARTERS, MARY; Zoology, Entomology, Botany, Chemistry, Anatomy; 130 W. Ninth Ave., Columbus.
- WEATHERBY, BENJAMIN B.; Physics; Toledo University, Toledo.
- WELTON, F. A.; Agronomy; Ohio Agricultural Experiment Station, Wooster.
- WHITE, GEO. W.; Geology; 86 E. Lincoln St., Westerville.
- WILSON, IRA T.; Zoology; Heidelberg University, Tiffin.
- YEE, MARTIN A.; Medical Sciences, Biology; University of the City of Toledo, Toledo.
- YOUNG, H. C.; Botany; Ohio Agricultural Experiment Station; Wooster.
- ZINKE, STANLEY G.; Meteorology, Ecology, Medical Sciences; 1814 Vine St., Cincinnati.
- ZINZON, W. A.; Physics; New Concord.

Report of the Committee on Election of Fellows:

The following report of the Committee on Election of Fellows was accepted and ordered filed:

COLUMBUS, O., April 18, 1924.

To the Ohio Academy of Science:

A meeting of the Committee on the Election of Fellows was held last evening in Columbus at the office of the Secretary. Eight members of the committee were present, one was represented by proxy, and two were absent without representation.

Of the candidates considered, fourteen received the necessary nine favorable votes and were declared elected. The fellows elected will be personally notified, and the list will be published in the Proceedings.

Respectfully submitted,

WILLIAM H. ALEXANDER, *Secretary.*

For the Committee.

The following is a list of those elected to fellowship:

RALPH V. BANGHAM	LAWRENCE L. HUBER
JOHN W. BARINGER	THOMAS G. PHILLIPS
SAMUEL WOOD CHASE	EDMUND SECREST
GUY W. CONREY	ERNEST RICE SMITH
FLOYD CARLTON DOCKERAY	PARIS B. STOCKDALE
H. A. GOSSARD	HERBERT ANDERSON TOOPS
ROY GRAHAM HOSKINS	CHARLES J. WILLARD

Resolutions.

The following resolutions were unanimously adopted by the Academy:

1. The Academy wishes to thank the members of the Local Committee and the officers of the Ohio State University for the efforts they have made and the courtesies they have extended toward making the Thirty-Fourth Annual Meeting of the Ohio Academy of Science a success.

2. The Academy wishes to express to Dr. Albert P. Mathews, Professor of Biochemistry at the University of Cincinnati, its appreciation of the special lecture on "How Shall We Measure the Quantity of Life?"

3. The Academy wishes to express its endorsement of the resolutions submitted to the United States Congress by the American Ecological Society, to set aside the Glacier Bay region as a National Monument.

Report of the Committee on Necrology.

The following report of the Committee on Necrology was adopted by the Academy and ordered filed:

MEMORIAL TO DR. THOMAS CORWIN MENDENHALL.

The Ohio Academy of Science mourns today a trusted leader and former president, Thomas Corwin Mendenhall. He was eminent in Physical Science as an investigator, a teacher, an expositor and an organizer. The Franklin Institute of Philadelphia in granting to him in 1918 the Franklin medal, "founded for the recognition of those workers in physical science, * * * * * whose efforts have done most to advance a knowledge of physical science" made their award "in recognition of his fruitful and indefatigable labors in physical research, particularly his contribution to our knowledge of physical constants and electrical standards." This was one of a long series of similar awards, crowning his fifty years of leadership in Science.

Born at Hanoverton, Ohio, October 4, 1841, and living till March 22, 1924, his life covered one of the most eventful periods of human history and his scientific career was coincident with many of the most striking developments of modern science.

His earliest scientific paper was published in 1870. For the succeeding thirty years his contributions to the leading scientific periodicals were frequent and important. The Proceedings of the A. A. A. S., the American Journal of Science, Popular Science Monthly, Science, and the U. S. Coast and Geodetic Survey, were principal avenues of publication.

As the first professor of physics of the Ohio State University, the pioneer work of equipping and putting into service a laboratory for instruction and research fell to him. He began this work in 1873, the first man elected to the faculty of the newly organized institution.

In 1878 he accepted the task of organizing the Physics department of the Imperial University of Japan at Tokio. He also founded the meteorological observatory there. His research work in Japan included careful measurements of the gravitation constant at Tokio and on the summit of Fujiyama, a determination of the density of the earth and some very accurate work with a Rutherford grating on the lines of the sun's spectrum. The celebrated astronomer, Professor Young of Princeton, pronounced these results as extraordinary. He also helped found the Seismological Society of Japan, which has done more than any other organization to make seismology an exact science.

In 1881 he returned to this country and resumed his work at Ohio State University. In the following year he organized the Ohio State Weather Service. His activity in seismology continued after his return.

In 1884 he became professor in the U. S. Signal Corps at Washington and developed instruments for the study of earthquakes. He also started C. F. Marvin, a former student of his in Ohio and the present distinguished Head of the U. S. Weather Bureau, in this same line of work. Dr. Mendenhall also began at this time an elaborate study of atmospheric electricity.

In 1886 he became president of the Rose Polytechnic Institute. Though a capable administrator he somehow kept up his scientific investigations and published four or five scientific papers during his three years presidency. The National Academy of Sciences also published a large volume on his work during this period in atmospheric electricity.

In 1889 he was made Superintendent of the U. S. Geodetic Survey. He here developed the famous "Mendenhall half-second pendulum," which for more than 25 years continued to do extraordinarily accurate work in fifteen Survey stations, and is still relied upon for the most exact results. One of these instruments was carried to Alaska, repeatedly landed in a surf boat for observations and when brought back to Washington gave the same value for "g" that it had given before the journey, to one part in 5,000,000. The reports and bulletins of the Survey contain many of his papers between 1889 and 1894. He was also made Superintendent of Weights and Measures and achieved the important task of putting our national system of weights and measures upon a Metric basis.

In 1893 he was one of five eminent electricians (chosen by mail ballot of 150 leading electrical men) to represent the United States at the International Electrical Congress at Chicago. Differences of opinion

developed there threatened to make agreement upon definitions of the principal electrical units impossible. The Franklin Institute now exhibits a sheet of paper on which Dr. Mendenhall one evening wrote down definitions of the ampere, the volt and the ohm. These he presented next morning to the Chamber of delegates; and the definitions finally adopted are practically identical with his penciled memorandum.

In 1894 he began a seven year service as president of the Worcester Polytechnic Institute.

His work as an investigator and as an organizer of research was indeed notable, but he also had a most unusual gift for making the results of scientific work intelligible and interesting to popular audiences. As a consequence he has been for many years repeatedly called upon for memorial and dedicatory addresses. In 1892 he gave a Convocation Address at Johns Hopkins on "Measurements of Precision, considered in Their Relation to the Condition of Man," and the same year prepared the principal address for the dedication of the new Ryerson Laboratory of the University of Chicago. He gave two series of lectures at the famous Lowell Institute in Boston, one in 1882 and one in 1892. Also lectures at Cooper Union, New York and in Philadelphia, Baltimore and Washington. In 1887 he was made a member of the National Academy of Sciences. In 1888 he was president of the American Association for the Advancement of Science and won golden opinions as presiding officer of the Toronto Meeting. The next year he gave the retiring presidential address at Indianapolis. In 1894 he gave an address as retiring president of the Philosophical Society of Washington. Many of us here remember the delightful address he gave a few years ago as president of our own Ohio Academy of Science and his address on "Some Metrological Memories" before the Franklin Institute in 1918.

His work has been recognized by the award of numerous decorations and medals. From the Paris Exposition in 1900 he received a medal for a monograph entitled "Scientific, Technical and Engineering Education in the United States," from the Imperial Education Society of Japan in 1911 a gold medal. The same year he was decorated with the Order of Sacred Treasures, Japan. The receipt of the gold medal of the Franklin Institute has already been mentioned.

These are but a few of the high points of achievement in a notable career in physical science.

Mention has already been made of his pioneer work in equipping and developing the physical laboratory of the Ohio State University and this is but a small part of his service to that institution. His wise selection of equipment is shown in the fact that many of his early purchases are still giving good service on lecture table and in laboratory. His inspiring leadership of many of the early graduates, such as C. F. Marvin, W. C. Sabine, C. F. Scott, gave them a real start in their notable scientific careers.

Professor Derby, one of his confreres on the faculty in the 80's, has written concerning his important part in determining the educational policy of the institution as follows: "In every faculty certain members are conceded leadership. It soon became plain to me that in questions of

common University concern we usually followed Dr. Mendenhall. In the field of our educational policy he exercised a directive mind. Other professors keen and able in their several subjects, were less attentive to the interests of the institution as a whole, or too individualistic to secure agreement with their suggestions. We were fully awake to the trend of various propositions brought before us and our discussions, though usually courteous, were earnest and now and then sharp in tone. A determination that the work of the institution should be exacting and of high quality was always evident, and any suspected failure to maintain that quality occasioned sharp criticism. In the maintenance of these high standards. Dr. Mendenhall was foremost and his pungent wit seldom missed its mark. When later he withdrew from the University to enter a different scientific field his former colleagues deplored the loss of a beloved comrade, notable scientist and leader in education, but followed his brilliant career with affectionate admiration."

For many years following 1901 a break in health forced him to retire from active scientific and educational work. It was with great satisfaction therefore that some of us heard in June, 1919, that the Governor had appointed him to be a Trustee of the Ohio State University, on the first faculty of which he had served so efficiently many years before. His wise leadership soon caused his election as Chairman of the Board, a position which he greatly honored. His interest in the University never lagged and his faith in its future was evidenced in many ways. One of his last acts was to sign the diplomas for the graduates of the winter quarter of 1924.

In the year 1920, on the occasion of the celebration of the fiftieth anniversary of the founding of the University, Dr. Mendenhall gave to the University a sum of money for the endowment of a gold medal to be known as the Joseph Sullivant Medal. This medal is to be awarded at five year intervals to "that son or daughter of the University who shall have done or have completed, within the five-year period since the last award, a really notable piece of work in either the Liberal, the Fine, or the Mechanic Arts, the pure or applied Sciences, including the various branches of Engineering." The first award was made in 1923 to Mr. Benjamin Garver Lamme, of the Class of 1888.

Dr. Mendenhall's active connection with our Ohio Academy of Sciences began shortly after his return to Ohio in 1912 and he has been a devoted and helpful member interested in promoting its every interest. Almost as soon as he had acquired membership he was elected President, a quite unusual proceeding. This occurred at the Oberlin meeting, 1913, and he served for the year 1914 with such skill and enthusiasm as to give us all renewed courage and confidence in the mission of the Academy.

As Trustee and for a number of years Chairman of the Research Fund of the Academy, serving from 1916 to his death, he was greatly interested in the use of the Academy funds for research and used rare discrimination in the assignment of its limited income to secure the largest benefits in the encouragement of research.

He was particularly interested in the securing of larger support for the Academy and served most faithfully on the legislative committee

which sought state support for Academy activities, especially for publication of the results of scientific studies. He expressed the hope and it was one of his cherished projects that the Academy might sometime be provided with a suitable building for its permanent home and as a center of its activities and that it might serve in some very vital way for the promotion of the scientific functions of the state. His recommendations and suggestions are matters of recent record and may well serve us in our future efforts for the development of scientific activities in the state.

With all these relations the thing that we feel most deeply today is the friendly nature of his work among us. With a most unusual experience in scientific development of more than a half century, a remarkable acquaintance with scientific work and workers he possessed such a broad appreciation of the work and accomplishment of others and such a friendly attitude toward even the most humble worker in the field of science that his presence and interest were a constant source of encouragement. With a multitude of honors and distinctions he was still one of the most democratic and unassuming of men. With a wealth of achievement, seldom equalled, to his credit he was ever modest in reference to the importance of his own contributions to science. He was a man whom we could admire and love, whose friendly greeting will be missed but whose memory will be cherished as representing the finest spirit of scientific devotion, achievement and fellowship. We have recorded our esteem and appreciation of his worth in such honors as it was in our power to give. We have now to place on record, as our lasting recognition of his leadership, this declaration of our high regard for his service, our great indebtedness for his many activities in the Academy and our tribute to his memory as a friend and fellow worker. His fine accomplishments and inspiring personality will long remain with us as a beautiful memory.

HERBERT OSBORN. *Chairman,*

A. D. COLE,

WM. MCPHERSON,

Committee on Necrology.

Meeting Place, 1925.

President Mather laid before the Academy the invitation from Wooster College to meet in Wooster next year. Mr. W. C. Devereaux stated that he was fully prepared and authorized to extend an invitation to the Academy to meet in Cincinnati next year but inasmuch as Wooster seemed to have a superior claim in that the Academy had never met in that city, he would withhold his invitation until some future time in favor of Wooster. Whereupon the Academy by vote declared itself in favor of accepting the invitation from Wooster College but left the final decision as to the next meeting place in the hands of the Executive Committee.

Change in Name of Section.

Upon motion of Mr. W. C. Devereaux, seconded by Prof. F. C. Blake, the Academy approved the changing of the name of the section heretofore known as *The Section of Physics* to that of *The Section of Physical Sciences*.

At the suggestion of Dr. E. L. Rice it was unanimously agreed that the passing of this motion would serve also as notice of such changes in the Constitution and By-Laws as might be necessary to conform to said motion.

Delegates to the Toronto Meeting of the B. A. A. S.

By motion duly made and seconded the Academy unanimously approved the recommendation of the Executive Committee that Dr. A. E. Waller and Dr. Edward L. Rice be designated as the duly accredited delegates of this Academy to the Annual Meeting of the British Association for the Advancement of Science to be held in Toronto, August 6-13, 1924.

Scientific Sessions.

The following is the complete scientific program of the meeting:

PRESIDENTIAL ADDRESS.

Geologic factors in social evolution.....KIRTLEY F. MATHER

PUBLIC LECTURE.

How shall we measure the quantity of life?.....ALBERT P. MATHEWS

PAPERS.

1. Laboratory exercises in atomic structure. (15 min.),
WM. LLOYD EVANS AND JESSE E. DAY
2. The valley of ten thousand smokes in 1923. (20 min., lantern),
KIRTLEY F. MATHER
3. Tantalum: The newest metal contributed by science to industry. (30 min.),
JAMES R. WITHROW
4. Recent work in endocrinology. (30 min., lantern).....R. G. HOSKINS
5. The weather. (15 min.).....W. C. DEVEREAUX
6. Pressure and life. (15 min.).....STANLEY G. ZINKE
7. Glare: With demonstrations. (30 min.).....F. C. CALDWELL
8. Medical education in Colonial America. (15 min.).....F. C. WAITE
9. The relation of fish production to forestation. (10 min.),
RAYMOND C. OSBURN
10. The application of radio in distance determination. (20 min.),
GEORGE LEWIS
11. A hydrogen sulfide delivery system. (7 min.).....JESSE E. DAY
12. Respiration in the orthoptera. (15 min.).....M. O. LEE
13. The nutrition of *Euglena gracilis*. (10 min.).....W. J. KOSTIR
14. Pest hunts in Wood County. (10 min.).....E. L. MOSELEY

15. The development of the intestinal coiling of the minnow (*Campostoma anomalum*). (10 min., lantern).....W. C. KRAATZ
16. Morphology of *gigantorhynchus* (*ancanthocephala*). (10 min.),
M. W. CASKEY
17. The periodical cicada in Ohio. (20 min., lantern).....H. A. GOSSARD
18. An Ohio record for the dragonfly (*Tachopteryx thoreyi*). (5 min.),
JAMES S. HINE
19. Parasites of the black bass. (10 min.).....R. V. BANGHAM
20. Habits of the common water snake, particularly in its relation to fish.
(5 min.).....F. A. HANAWALT
21. New terms suggested to designate the various modes of nutrition in
organisms. (5 min.).....W. J. KOSTIR
22. Recent mammal records in Ohio. (5 min.).....JAMES S. HINE
23. Ecologic notes on some homoptera of the southwest. (10 min., lantern),
HERBERT OSBORN
24. The early differentiation of the longitudinal zones in the neural plate of
rana. (10 min.).....R. A. KNOUFF
25. Two new hereditary tumors in *drosophila*. (15 min.).....IRA T. WILSON
26. The primitive lines in *amblystoma*. (15 min.).....F. L. LANDACRE
27. Comparisons of protozoan nuclei. (20 min.).....MAYNARD M. METCALF
28. A study of comparable developmental stages in chick and pig embryos.
(10 min.).....B. M. PATTEN
29. The differentiation of the epichordal and prechordal portions of the
brain in *amblystoma*. (10 min.).....R. C. BAKER
30. The spherical blackboard in the teaching of embryology. (5 min.),
EDWARD L. RICE
31. The effect on basal metabolism of ingested adrenalin chloride. (15 min.),
FRED A. HITCHCOCK
32. Heredity defects of the human hands, with special reference to symph-
alangism. (15 min.).....R. A. HEFNER
33. A novel type of symphalangism (?) or hypodactyly (?). (10 min.),
O. L. INMAN
34. Some practical and theoretical aspects of lubricating oil emulsions as a
scalecide. (10 min.).....L. L. HUBER
35. Interaction of the genes in the production of eye color in *drosophila*.
(10 min.).....W. P. SPENCER
36. The development of forestry practice. (25 min., lantern),
EDMUND SECREST
37. Botany: Opportunity. (15 min.).....MAXIMILIAN BRAAM
38. Present tendencies in high school biological courses. (10 min.),
WILLIAM E. NIEHAUS
39. Some Ohio inter morainal lakes and lake beds. (10 min., lantern),
GEORGE D. HUBBARD
40. The age of the glacial drift in Licking County, Ohio. (10 min.),
RALPH G. LUSK
41. Some glacial pebbles and cobbles found beyond the glacial boundary in
Muskingum and Guernsey counties. (10 min.).....C. F. MOSES
42. The composition of the Illinoian drift in Clermont County, Ohio. (5 min.),
G. W. CONREY
43. Drainage changes in the Warren-Youngstown-Sharon-New Castle areas.
(20 min.).....G. F. LAMB
44. Erosion levels in the Colorado Plateau. (15 min.).....ROBERT F. WEBB
45. Differences in the form of species usually regarded as common to North
America and Europe. (15 min.).....AUGUST F. FOERSTE
46. Plant life in ordovician and silurian times. (10 min.).....AUGUST F. FOERSTE
47. The positions occupied by orthoceroids while alive. (10 min.),
AUGUST F. FOERSTE
48. An amphibian trail from Pottsville formation. (5 min.).....G. F. LAMB
49. The Cleveland shale fishes of northern Ohio. (25 min., lantern).....J. E. HYDE
50. Two recent papers on the earth's interior. (15 min.).....WALTER H. BUCHER

51. The importance of water conditions on the shallow oil sands of Ohio. (15 min.).....KENNETH COTTINGHAM
52. The structure of the Clinton sandstone in Ohio and its relation to oil and gas accumulation. (15 min.).....ROBERT LOCKETT
53. Clinton sand structure of northern Ohio in its relation to production. (15 min.).....A. W. MELHORN
54. A structural feature of Wood County, Ohio. (10 min.)...J. ERNEST CARMAN
55. The decline of mining activity in Colorado. (30 min., lantern),
FRANK R. VAN HORN
56. The glass sands of Ohio. (10 min.).....J. A. BOWNOCKER
57. Bacterial precipitation in fresh water. (15 min., lantern),
ALLYN C. SWINNERTON
58. The significance to sedimentation of the Amherst Berea deposits. (15 min., lantern).....J. E. HYDE
59. Some broader correlations of the Richmond. (15 min., lantern),
W. H. SHIDELER
60. The rock section at the O'Shaughnessey Dam. (10 min.)...J. ERNEST CARMAN
61. Effect of cutting upon the rate of hair growth. (5 min.)...R. J. SEYMOUR
62. Formation and structure of dental enamel. (15 min.)...SAMUEL W. CHASE
63. Status of the occupational disease question in Ohio, based on official figures. Present tendencies. (15 min., lantern)...EMERY R. HAYHURST
63. Recent studies on food accessories in a legume. (10 min.)...H. H. M. BOWMAN
64. Effect of basal metabolism of adrenalin by mouth. (10 min.),
F. A. HITCHCOCK
65. Factors that influence the knee jerk. (15 min.).....W. W. TUTTLE
66. Effect of adrenalin on the temperature of the brain. (10 min.),
W. P. SPENCER AND M. W. CASKEY
67. Relations of adrenals to bodily activities of the rat. (12 min.),
E. P. DURRANT
68. The effects of syphilis on dentition and on tooth structure. (15 min.),
L. J. KARNOSH
69. The nutritive value of a little-known bean. (10 min.).....H. H. M. BOWMAN
70. Blood sugar studies. (15 min.).....E. C. ALBRITTON
71. Calcium deficiency as a factor in psychopathy. (20 min.),
FLORENCE MATEER
72. Psychological method of studying. (30 min.).....HAROLD E. BURTT
73. A study in the evolution of concepts. (30 min.).....GARRY C. MYERS
74. Utilizing college records, including appointment blanks to predict after-college success of students. (15 min.).....LAURA CHASSEL TOOPS
75. An investigation of the development of personality in children. (10 min.),
O. R. CHAMBERS
76. Notes on musical aesthetics.PAUL R. FARNESWORTH
77. The necessary postulates of empirical psychology. (15 min.), H. M. JOHNSON
78. The development of bisporangiate flowers in *Sagittaria latifolia*. (8 min.),
JOHN H. SCHAFFNER
79. A case of teratological inflorescence in alsike clover. (8 min.), FREDA DETMERS
80. Some new heritable characters of corn found in the culture at Ohio State University. Introduced by W. G. Stover. (10 min., lantern),
MARION T. MEYERS
81. Studies of variation in the fleshy fungi. (15 min.).....H. C. BEARDSLEE
82. The trend of investigation in plant growth. (20 min.).....H. C. SAMPSON
83. The change of opposite to alternate phyllotaxy in hemp by means of photoperiodism. (10 min.).....JOHN H. SCHAFFNER
84. The physiology of stomata. (20 min., lantern).....J. D. SAYRE
85. The diffusion of water-vapor through small openings. (20 min., lantern),
J. D. SAYRE
85. Water transfer in plant cells. (10 min.).....H. M. BENEDICT
86. The nutrition of *Euglena gracilis*. (10 min.).....W. J. KOSTIR
87. Some filamentous algae from Iowa. (10 min., lantern).....L. H. TIFFANY
88. The zygnumales. (15 min.).....E. N. TRANSEAU

- 89. The peculiar flora of the sand region west of Toledo. (10 min.),
E. L. MOSELEY
- 90. The distribution of the pine in Ohio. (20 min., lantern).....FOREST DEAN
- 91. The economic features of the yellow poplar in Ohio. (15 min., lantern),
O. A. ALDERMAN
- 92. Progress report on plantings on the slope of the dams in the Miami Con-
servancy District. (25 min., lantern).....A. E. WALLER
- 93. Observations of a plant collector on the Island of Hainan. (By invita-
tion). Introduced by A. E. Waller. (30 min., lantern)...F. A. MCCLURE
- 94. The uredinales of Ohio. (Preliminary). (10 min.).....W. G. STOVER
- 95. The relation of weather conditions to the development of apple scab at
Columbus in 1923. (12 min., lantern).....HOWARD W. JOHNSON
- 96. The infection period of apple blotch in central Ohio in 1923. (8 min.,
lantern).....CURTIS MAY
- 97. The relation of *Fusarium moniliforme* to the ear, stalk and root-rot of
corn. Introduced by W. G. Stover. (10 min., lantern)...D. P. LIMBER
- 98. Studies of toxin production in the fusarium wilt of tomato. Introduced
by W. G. Stover. (10 min.).....IVAN E. MASSAR
- 99. A bud sport in *pelargonium* accompanied by the loss of two chromosomes.
(Read by title).....PAUL B. SEARS

DEMONSTRATIONS.

- a. Yellow poplar wood.....O. A. ALDERMAN
- b. Corn.....MARION T. MYERS
- c. Lower jaw of a boar showing tusks.....WILLIAM E. NIEHAUS
- d. Water snake (*Tropidonotus fasciatus*) in the act of swallowing a creek
sucker.....F. A. HANNAWALT
- e. Skeleton mount of common mole (*Scalopus aquaticus machrinus*). W. H. CAMP
- f. Plaster cast of earthworm (*Lumbricus terrestris*). Cross section,
HENRY OLSON
- g. Examples of certain homoptera of the Southwest, with photographs of
their habitats.....HERBERT OSBORN
- h. Activity cages.....E. P. DURRANT
- i. The structure of dental enamel.....SAMUEL W. CHASE
- j. A novel form of symphalangism, or hypodactyly.....ONDESS L. INMAN
- k. A new type of physiographic map.....KIRTLEY F. MATHER